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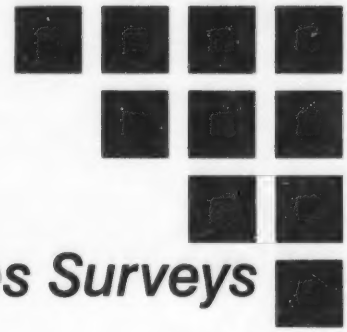


The National Graduates Surveys

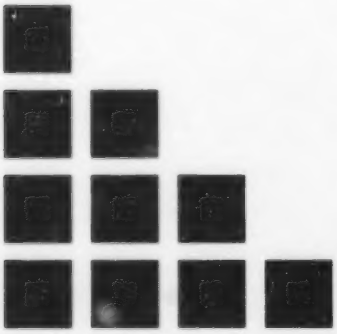
Consequences and Policy Implications for University Students Who Have Chosen Liberal or Vocational Education:
Labour Market Outcomes and Employability Skills

R-00-2-3E

by
Zeng Lin, Robert Sweet, Paul Anisef and Hans Schuetze

December 2000

Research Paper



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▬

This report is part of a set of research studies on the National Graduates Surveys. /
Le présent rapport fait partie d'un ensemble d'études sur les Enquêtes nationales auprès de diplômés.

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Printed/Imprimé 2001
ISBN: 0-662-29965-5
Cat. No./N° de cat. MP32-29/00-2-3E

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Executive Summary

In this report the authors explore two questions related to the debate surrounding the relative value of a liberal or vocation education: (1) What are the labour market consequences of having chosen a particular field of study for university graduates? (2) Do the employability skills or university graduates enrolled in liberal and vocational fields of study differ significantly?

The authors' analysis indicate that fields of study choices are significantly related to transition success. Specifically, it appears the labour market favours vocational over liberal graduates with regard to labour force status, employment income, job permanence and job satisfaction. In all instances, vocational graduates enjoy significantly greater labour market returns than liberal graduates. It is, however, important to keep in mind that the authors assessed outcomes for the two year period immediately following graduation. Labour market indicators for the two groups may be quite different over a longer period of time.

To further explore the basis for differences in labour market outcomes, the authors examined the role of 'employability' skills in transition success. Given the strong and consistent differences in labour market outcomes between liberal and vocational graduates, the authors anticipated similar differences in employability skills across these groups. However, what the authors found was a surprising lack of difference between liberal and vocational graduates in their perceived possession and acquisition of employability skills. Employers were nevertheless more likely to utilize employability skills from vocational than liberal graduates. Signal theory (Rosenbaum, 1999) would suggest that differences in the opportunity to apply such skills might be due to problems in the flow of trustworthy signals between graduates and employers. Greater trust between employers and graduates with respect to skills utilization likely reflects the more formalised network with respect to vocational fields of study that link employers, students and the university.

To further explore the means by which better communication and understanding is established with employers, labour market outcomes were examined for students enrolled in co-op education programs in which employers and potential employees are brought into closer contact. The empirical results suggest that the greater exposure to the work place offered through co-op education furthers development of linkages between employers and graduates and is reflected in more positive school-work transitions.

The empirical findings revealed in this study suggest several policy considerations that pertain to improving upon school - work transitions for university graduates. First, the authors found that the selection of a field of study by students is part of a process of risk taking, in which latent labour market consequences cannot be anticipated. One of the keys to dealing with such risks is to provide students with career related information before they make such fields of study choices. A second area of concern to policy makers involves the less favourable labour market outcomes of liberal graduates who possess employability skills similar to those of vocational graduates. Liberal education graduates are afforded significantly less opportunity to utilize their skills in the workplace. Efforts need to be directed at narrowing initial labour market outcome gaps between

liberal and vocational graduates, particularly since research does demonstrate that liberal education graduates manage, in the long run, to increase their incomes at a faster pace than their vocationally oriented peers. One way to address this problem is to create bridges between liberal education students and their potential employers—such as co-op programs. It also is essential to raise the awareness of employers that liberal graduates – like their vocational counterparts – possess a considerable store of employability skills. They need to be provided with opportunities to prove their mettle on-the-job. This effort to raise awareness would involve, at a minimum, greater dissemination of the results of this and other similar research studies to employer groups across the country.

The authors' analyses highlight the importance of the relationship between fields of study choice and labour market outcomes in the study of school-work transitions. In this sense their findings reinforce previous research on education-work linkages for university graduates. Yet, more research is required not only on university graduates but on those who employ graduates. Moreover, their analysis hinges on self-reported data by university graduates. Hence, an understanding of differences in skills and the application of these skills depend on the perceptions of graduates. Having similar information from employers and comparing such data with that obtained from university graduates would provide insights on the school-to-work transition system.

Sommaire

Les auteurs du présent rapport explorent deux questions au cœur du débat entourant l'intérêt comparatif des arts libéraux et des disciplines professionnelles : 1) Quelle est la situation sur le marché du travail des diplômés d'université qui ont choisi tel ou tel domaine d'études? 2) Est-ce que les compétences relatives à l'employabilité des diplômés d'université varient sensiblement selon qu'ils étaient inscrits aux arts libéraux ou dans une discipline professionnelle?

Les auteurs montrent qu'il y a une relation significative entre le choix du domaine d'études et le succès de la transition. Plus précisément, il semble que les étudiants ayant choisi une discipline professionnelle se retrouvent en meilleure position sur le marché du travail que les étudiants ayant choisi les arts libéraux, et ce, à divers points de vue, soit situation d'activité, revenu tiré de l'emploi, permanence de l'emploi et satisfaction face à l'emploi. Dans tous les cas, les diplômés des disciplines professionnelles avaient obtenu des rendements sur le marché du travail de beaucoup supérieurs à ceux des diplômés des arts libéraux. Il est toutefois important de se souvenirles auteurs ont évalué les résultats obtenus par les étudiants au cours des deux années ayant suivi immédiatement l'obtention du diplôme. Les indicateurs du marché du travail des deux groupes pourront différer sensiblement à plus long terme.

Pour examiner plus avant les facteurs qui peuvent expliquer ces différences, les auteurs se sont intéressés au rôle des compétences relatives à « l'employabilité » dans le succès de la transition. Étant donné les différences importantes et systématiques que les auteurs ont constaté dans les résultats obtenus sur le marché du travail par les deux groupes de diplômés, ils s'attendaient à trouver des différences de même ordre dans leurs compétences respectives en matière d'employabilité. Cependant, les auteurs ont été étonnés du peu de différences dans la façon dont les deux groupes percevaient les compétences relatives à l'employabilité qu'ils possédaient et qu'ils avaient acquises. Les employeurs étaient néanmoins plus susceptibles d'exploiter les compétences relatives à l'employabilité des diplômés des disciplines professionnelles que des diplômés des arts libéraux. Selon la théorie des signaux (Rosenbaum, 1999), les différences dans les occasions de mettre ces compétences en pratique peuvent s'expliquer par des problèmes dans la transmission de signaux de confiance entre les diplômés et les employeurs. La plus grande confiance qui règne entre les employeurs et les diplômés en ce qui concerne l'utilisation des compétences s'explique vraisemblablement par le réseau plus formel qui lie les employeurs, les étudiants et l'université dans les disciplines professionnelles.

Pour étudier de façon plus détaillée les mécanismes grâce auxquels s'établissent de meilleures communications et une meilleure compréhension entre les employeurs et les diplômés, les auteurs ont examiné les résultats sur le marché du travail des étudiants inscrits à des programmes d'alternance travail-études dans le cadre desquels les employeurs et les employés éventuels sont appelés à entretenir des contacts plus étroits. Leurs résultats empiriques laissent penser que les programmes d'alternance offrent une plus grande exposition au milieu de travail, ce qui permet aux diplômés d'établir des liens plus serrés avec les employeurs, et partant, de mieux réussir la transition entre les études et le monde du travail.

Selon les constatations empiriques de l'étude, il y a lieu d'envisager divers éléments d'ordre stratégique qui permettraient d'améliorer la transition entre les études et le monde du travail chez les diplômés d'université. Premièrement, les auteurs ont constaté que le choix du domaine d'études fait partie d'un processus de prise de risque de la part des étudiants suivant lequel il est impossible de prévoir les conséquences latentes qui se manifesteront sur le marché du travail. L'un des principaux moyens d'atténuer de tels risques est de fournir aux étudiants de l'information relative aux carrières avant qu'ils choisissent leur domaine d'études. Deuxième élément sur lequel les décideurs pourraient se pencher : les résultats moins favorables sur le marché du travail des diplômés des arts libéraux qui possèdent, en matière d'employabilité, des compétences semblables à celles des diplômés des disciplines professionnelles. Les diplômés des arts libéraux ont sensiblement moins d'occasions de mettre leurs compétences en pratique dans le milieu de travail. Il faut prendre des mesures qui diminueront les différences initiales dans les résultats obtenus sur le marché du travail par les diplômés des deux groupes, d'autant plus que la recherche montre que les diplômés des arts libéraux réussissent, à long terme, à accroître plus rapidement leur revenu que les diplômés des disciplines professionnelles. Une façon de régler ce problème serait de créer des maillages entre les étudiants des arts libéraux et des employeurs éventuels — par exemple dans le cadre de programmes d'alternance. Il est également essentiel de faire savoir aux employeurs que les diplômés des programmes d'arts libéraux — comme leurs confrères et consœurs des disciplines professionnelles — possèdent une vaste gamme de compétences en matière d'employabilité. Il faut leur donner l'occasion de les mettre en pratique en cours d'emploi. De telles mesures de sensibilisation nécessiteraient à tout le moins que les résultats de cette étude et d'autres recherches semblables soient plus largement diffusés auprès de groupes d'employeurs partout au pays.

Les travaux des auteurs font ressortir l'importance de la relation entre le domaine d'études et les résultats obtenus sur le marché du travail dans une analyse des transitions entre les études et le monde du travail. En ce sens, leurs conclusions viennent confirmer les constatations de recherches antérieures sur les liens entre l'éducation et le travail chez les diplômés d'université. Cependant, il faudra faire d'autres travaux, non seulement auprès des diplômés d'université, mais également auprès des employeurs qui les recrutent. De surcroît, leur travail s'est concentré sur les données autodéclarées par les diplômés d'université. L'analyse des différences dans les compétences et la façon dont elles sont appliquées repose donc sur les perceptions des diplômés. Il serait utile de disposer de données de même nature provenant des employeurs et de comparer les deux séries de données pour mieux comprendre le processus de transition entre les études et le monde du travail.

Acknowledgements

Zeng Lin and his research team gratefully acknowledge receiving helpful comments from Patrice de Broucker (Chief, Integration, Analysis, and Special Projects Section) and other, anonymous, reviewers. Thanks also go to Shelley Harris who has provided us with excellent research assistance.

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1. Introduction

One of the most important decisions made by students, either prior to entering university or while enrolled in university, is their choice of a field of study. This choice has strong implications for future life-course pathways, including long-term labour market outcomes (HRDC, 1996). Studies of individual career paths suggest that the period immediately following graduation – e.g. the two years following graduation – strongly influences eventual position in the labour force (Anisef, Turrittin & Lin, 1999). If early employment experiences are important to career building, it is essential to examine linkages between fields of study and labour market outcomes during the school-work transition phase. In this report we take up the question: *What are the immediate labour market consequences of having chosen a particular field of study for university graduates?*

Debates over the differential outcomes afforded by a university education focus on the tension between cultural and instrumental values or, more specifically, the tension between liberal and vocational education. We define liberal education as a pedagogy that provides a broad, balanced, flexible, and human-centred education. Hence, the main functions of a liberal education are to advance and disseminate knowledge and to facilitate personal growth and development among the students that enrol. Vocational education, on the other hand, aims to provide specific skills for certain professions. Skill training occupies a central place in providing such an education.

Much current debate involving the impact of field of study on school-work transitions concerns the relative value of a liberal or vocational education. For the most part, these discussions occur among academics that argue for the importance of a humanistic education in the personal and intellectual growth of students (Anisef, Axelrod & Lin, 1999). Employers are equally divided in their assessments of liberal or vocationally-oriented university programs but all are consistent in their desire to engage employees who possess the 'employability skills' needed to meet the demands of the new economy – that is, graduates who are socially adept and who have the capacity to solve problems, judge merit, and make decisions (Conference Board of Canada, 1998).

The critics of a liberal education argue that students who are trained in these fields are ill equipped to locate challenging and satisfying jobs while the critics of a vocational education are equally quick to argue that students exposed to a vocational education are too narrowly trained and generally incapable of dealing with the complexities of a global society. Thus, a second question that we seek to answer in this report is: *Do the employability skills possessed, acquired and utilized by university graduates enrolled in liberal and vocational fields of study differ significantly?*

Skills acquired by university graduates in different fields of study may or may not meet the needs of employers struggling to compete in the highly competitive global economy; and the debate over the utility of liberal or vocational fields of study suggests this is, in fact, the case. In explaining differences in the labour market outcomes of university graduates it should prove illuminating to compare liberal and vocational graduates' acquisition of the skills employers contend are of value to them. One also can assess employers' utilisation of the skills possessed by graduates and the comparison made between possession and application. Where there are no significant differences in the skills liberal and vocational graduates report they possess yet substantial variations exist in how employers value and utilise them (e.g. significant differences in salaries) one may conclude discontinuities exist between the rhetoric and practice of employers. It may be that employers respond more to field of study labels than to the cognitive skills these fields impart (Rosenbaum, Kariya, Settersten & Maier, 1990). It also is possible that the skill profiles of liberal and vocational graduates vary in complex ways making it difficult for employers to interpret and make the best use of graduates' skill. Alternative explanations also are possible. Krahn and Lowe (1998) and Livingstone (1999), for example, have argued that the economy fails to provide work requiring advanced skills and knowledge. From this perspective, employers are essentially under-employing graduates (Anisef et al. 1996).

2. Research Questions and Rationale

2.1 School-Work Transitions

The first question addressed in the study involves an examination of the link between field of study choice and labour market outcomes. The theoretical perspective we rely on in exploring the labour market pathways of university graduates relates to the work of Beck (1992, 1999) who argues that we now live in a risk society where school-work transitions are no longer predictable and linear. Rather, they are more uncertain in nature and call increasingly on individuals to make careful plans for the future. Rudd and Evans (1998) use the term 'structured individualisation' to describe pathways as outcomes resulting from individual choice and experience (agency), and influenced as well by demographic, cultural and structural influences (structure). Anisef et al. (1999), Hays (1994) and others similarly assert that structure and agency combine to influence the decisions and actions taken by individuals and in that way influence their life chances. Heinz (1999) and Furlong and Cartmel (1997) have characterised school-work transitions as a series of agentic actions which lead individuals to achieve more or less successful employment futures in a rapidly changing economy.

The occupational structure of Canada has been undergoing dramatic change in recent years. Two key features of the changing Canadian economy are reflected in the distinction currently being made between knowledge-based and skills-intensified characteristics. It should be noted that most studies do not distinguish knowledge from skills. The term, knowledge-based, refers to general skills including academic capability, personal management, and teamwork (Betcherman et al., 1998:8). "Skills-intensified" involves specific techniques, including "know-how" and job specific skills. These two characteristics of the new economy have quickly emerged as central in discussions over the relationship between education and labour market outcomes, as well as the debate around the value of a liberal (knowledge-based) and vocational education (skill-intensified).

In *Reflections on the Changing Workplace in Canada*, Osberg (1997) indicates that risk has become greatly individualised as support for post-secondary funding fails to increase and tuition costs rise. Students must be clear in choosing their area of study, since they are now faced with

the prospect of much greater debt loads upon graduation (pp.150-1). The sense of risk in choosing among fields of study is also reinforced by the notion that such fields play an important role in stratifying Canadian university graduates in terms of income, unemployment rates, work prospects, and job satisfaction. For example, the full time earnings of the highest 10 percent of graduates from medicine are $114,500, their unemployment rate is about 5 percent, lower than most graduates in other areas of study, and 98 percent of them are satisfied with their work (HRDC, 1996:188-9; Little & Lapierre, 1996:30). In contrast, for the highest 10 percent of history graduates, full time earnings are $53,200, less than half that made by graduates from medicine. As well, they experience a higher unemployment rate, although 82 percent of them are satisfied with their work, which indicates reasonable job satisfaction (HRDC, 1996:166-7).

Based on structuralist perspectives, researchers have attempted to link field of study choice and educational returns to individuals. In this regard, gender, ethnicity, family background, and region of origin are frequently introduced to contextualize field of study decisions. Davies & Guppy's (1997) analysis of national longitudinal survey data revealed that U.S. male college students were much more likely than females to enter fields of study with high economic returns. In addition, socio-economic factors did not affect entry into lucrative fields net of other background factors, but did affect entry into selective colleges.

Wannell & Charon (1995) reveal, for example, that women are more likely to study in nursing (95%), social sciences, and humanities, while men dominate in the fields of engineering (85.4%), computer science (80.4%), and other sciences (p. 22). The choice of areas of study can be understood not only in terms of gender, it can also interpreted in terms of race and social class. For instance, Aronowitz and Giroux (1985) suggest that liberal arts programs within U.S. colleges are "dumping grounds" for minority and working class children. Despite field of study appearing to be a matter of individual preference, it is one, nonetheless, that is significantly influenced by gender and social class, even when personal academic achievement levels are controlled (Davies & Guppy, 1997). In addition, regional differentiation is widely used to characterise the Canadian university system, insofar as policy changes fall under the jurisdiction of the provinces and territories (Jones, 1997). This suggests the importance of including region as a structural factor in exploring field of study choices. In addition to assessing the influence of social structural factors on the choice of fields of study and labour market outcomes, it is also

important that we assess the impact of agentic factors (as indicated by field of study choice) on labour market outcomes of university graduates. Faced with a sense of increased risk, it is rational for students to react either by "diversifying their portfolios" by opting for generalist, rather than specialist, credentials, or decreasing their level of investment (Osberg, 1997:151).

As suggested by this overview, there is relatively little research that has dealt directly with the relationship between university fields of study and labour market outcomes in the period following graduation. Existing studies nevertheless provide evidence that fields of study influence graduates' labour market outcomes in the long term. Allen (1999b), for example, used 1996 census data to illustrate wage differences among university graduates from various fields of study. Cote and Sweetman (1998) similarly analysed the 1994 General Social Survey data and found that fields of study effect on graduates' wages. These studies did not, however, detail the link between fields of study and the initial labour market position of graduates. In examining this relationship, the present study will focus attention on the school-to-work transition period.

2.2 Employability Skills

The second research question posed for the study addresses the role of employability skills in determining the labour market outcomes of graduates. The Conference Board of Canada recently released a report entitled *Employability Skills Profile: What are Employers Looking for?* (1998), in which they refer to such foundational skills as the generic intellectual skills, attitudes, and behaviours that employers look for in new recruits and that they seek to develop through on the job training programs for current employees. The profile developed by the Conference Board divides skills into academic skills (i.e. communication, thinking and learning), personal management (i.e. positive attitudes and behaviours, responsibility and adaptability), and teamwork skills (i.e. the ability to work effectively with others). While this report is useful in laying out the generic types of skills that are needed to fuel today's economy, it masks a series of debates that relate to: (1) the actual skills that employers actively seek among employees; (2) a growth in unemployment and underemployment at a time that the supply of highly educated people in Canada is greater than in any other period in its history.

A recent federal advisory panel, established to determine whether Canada is experiencing a shortage of skills, is recommending that all levels of our educational system – from elementary to

post-secondary – be reshaped to meet the needs of business. The Expert Panel on Skills in its final report, *Stepping Up: Skills and Opportunities in the Knowledge Economy* concluded that while there is no shortage in technical skills (Finnie, 1995), Canadians do lack essential communication and teamwork skills that are needed for today's business environment and schools need to better serve the interests of employers by promoting corporate values (cited in CAUT, 2000:1; 8). Many educators, however, are sceptical of this position and argue forcefully for a broad-based liberal education rather than one that caters specifically to corporate interests. Indeed, Gingras and Roy (1998) drawing principally on descriptive statistics, conclude that there is no reason to believe that Canada suffers from a broad based shortage of skilled labour or that its work force can not fulfil the economy's needs. Furthermore, available data indicate that Canada compares favourably with many of its principal competitors in world markets. However, Boothby (1999) recently completed a study drawing upon data from the International Adult Literacy Survey (IALS) that show that, while most Canadian post-secondary graduates have high levels of literacy skills approximately 17 percent – predominantly non-university graduates – have low levels of literacy skills (e.g. prose, document, and quantitative literacy). Since most post-secondary graduates tend to work in the skilled information sector, graduates with low literacy skills find it difficult to obtain positions within this sector and these mismatched graduates tend to earn less than do post-secondary graduates with appropriate literacy skills do. Though Boothby finds evidence for an increase in occupational mismatch between 1981 and 1991 for university graduates, he concludes that this increase is attributable to the number of graduates growing more rapidly than the level of paid employment in skilled information occupations (*Applied Research Bulletin*, 1999:19). In a separate analysis of the changing skill structure of employment in Canada, Gingras and Roy (1998) support the conclusions drawn by Boothby, indicating that the "supply of highly educated individuals appears to have more than offset increases in demand" (p. 37). However, employment in occupations requiring high levels of cognitive and communication skills has increased faster than in other occupations (p. 36).

In a report prepared by Krahn and Lowe (1998), the "job-skills gap" was explored in terms of workplace literacy utilisation. In order to address the existing research gap on this topic, these researchers used data from the Canadian component of the 1994 International Adult Literacy Survey (IALS). The first goal of the analysis was to map the "fit" or "mismatch" between

workers' literacy skills and their job requirements. Within the "mismatch" category, the prevalence of literacy deficits (i.e. workers with limited literacy skills in jobs that frequently require reading, writing, and mathematical operations) and literacy surpluses (workers with well developed literacy skills in jobs that did not take advantage of these skills) was documented. This analysis of IALS data revealed that about three-quarters of Canadian workers were in jobs with literacy skill requirements that roughly "fit" their literacy skills. Within the "mismatch" category, literacy surplus was much more evident than literacy deficit. Thus, with respect to literacy, the "job skills gap" may actually have resulted from not having enough high skill jobs. While there clearly were workers with limited literacy skills, there were many more in jobs that did not take full advantage of their well developed literacy skills. Livingstone (1999) similarly suggests that overall technical skill requirements have only gradually increased in recent decades in the U.S. and Canada and deskilling may now be almost as prevalent as upgrading, even in high tech industries (1999:7) Part of the irony of the education-jobs gap has been that conditions of underemployment become associated with further learning. As a consequence, "A vicious circle of more learning for fewer jobs is now well established" (Livingstone, 1999:6).

3. Organisation

Consistent with the research questions posed, the study is organized in two sections. In the first section we first draw a 'map' of the graduates' labour market experiences and relate these to their fields of study. This profile of the linkage between school and work serves to establish the importance of the relationship between fields of study choice and labour market consequences. It also provides a context for the second section in which we examine the transition process itself. At this point, we refer to the theoretical concepts of social structure and individual agency in establishing the importance of fields of study choice in setting the conditions for transition success. Structural factors such as gender, ethnicity, parents' education, and geographic region undoubtedly influence one's social and economic standing but individual actions – such as choosing a field of study – also play a role. We next examine the relationship between fields of study choice (liberal or vocational) and labour market outcomes, including indicators of income, employment stability and job satisfaction.

The second section of the study further explains the school-work relationship by exploring aspects of graduates' intellectual and social skills that employers ostensibly value and reward in the graduates they employ. These so-called 'employability skills' (Conference Board of Canada, 1990) are analysed in terms of the liberal and vocational graduates' personal possession and utilization of them in their jobs. The important role of employers in determining the strength of the relationship between field of study and labour market outcomes also is discussed by considering the potential of practica, internships, and work experience programs to familiarise employers with students' skills and in shaping their views of the university curriculum, both liberal and vocational.

In the conclusion section, the implications of this overview of graduates' experiences of the school-work transition process are summarised and some of the more salient policy research implications are drawn.

4. Data Sources and Research Methods

4.1 The National Graduates Survey and the Working Samples

On behalf of Human Resources Development Canada, Statistics Canada conducts the NGS to learn about graduates' labour market experiences after graduation. Along with early labour market experiences, the surveys gather a wealth of information on education training, personal characteristics and earning estimations. In 1997, 21,824 randomly selected 1995 graduates were interviewed by telephone two years after graduation, representing 157,226 university students who graduated in 1995 (weighted). Similar surveys of the classes of '82, '86, and '90 graduates were also conducted. For the purposes of this study, 13,183 graduates who obtained bachelor or ordinary degrees were selected, which represents 134,025 university graduates as the working sample (weighted).

The National Graduates Surveys

The National Graduates Surveys (NGS), sponsored by Human Resources Development Canada and conducted by Statistics Canada, are specifically designed to obtain information on the relationship between education/training and labour market activities, the long-term labour market experiences of graduates, the employment, earnings, occupation and additional educational experiences and qualifications of graduates. The NGS focus on individuals who had obtained a degree, diploma or certificate from a trade/vocational school, a career/technical college (or CEGEP) or a university, and who were still living in Canada at the time of the survey. The NGS files are representative of the underlying graduate population in Canada.

Background

Statistics Canada conducted a first survey in 1978 on the labour market experiences of 1976 graduates from universities and community colleges in Canada. In 1984, a similar survey, the NGS of 1982 graduates was sponsored jointly by the Department of the Secretary of State and Employment and Immigration Canada and conducted by Statistics Canada. This survey expanded on the content of the previous survey and extended the population base to include graduates of trade/vocational programs in addition to graduates from community colleges and universities.

Since 1982, four cohorts of graduates have been surveyed. Every cohort was interviewed two and five years after graduation.

Year of graduation	First interview	Follow-up interview
1982	1984	1987
1986	1988	1991
1990	1992	1995
1995	1997	2000

The 2000 Follow-up Survey of the 1995 Graduates included a 'brain drain' component. Those who graduated in 1995 but who were living in the United States in June 2000 were included in the survey.

4. Data Sources and Research Methods

4.1 The National Graduates Survey and the Working Samples

On behalf of Human Resources Development Canada, Statistics Canada conducts the NGS to learn about graduates' labour market experiences after graduation. Along with early labour market experiences, the surveys gather a wealth of information on education training, personal characteristics and earning estimations. In 1997, 21,824 randomly selected 1995 graduates were interviewed by telephone two years after graduation, representing 157,226 university students who graduated in 1995 (weighted). Similar surveys of the classes of '82, '86, and '90 graduates were also conducted. For the purposes of this study, 13,183 graduates who obtained bachelor or ordinary degrees were selected, which represents 134,025 university graduates as the working sample (weighted).

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Objectives

The survey's key data objectives are:

- To obtain information for labour market analysis;
- To obtain information on the relationship between education/training and labour market experiences and the exposure of graduates to additional learning opportunities;
- To extend available information required to improve occupational supply and demand projection models and to conduct related studies of supply-demand imbalances in the labour market;
- To extend available information required to improve occupational supply and demand projection models and to conduct related studies of supply-demand imbalances in the labour market;
- To obtain data regarding longer-term market experiences of graduates;
- To obtain information on labour market experiences of members of target groups (such as women, visible minorities, native people, and persons with disabilities);
- To gain a better understanding of school-work transitions and returns to human capital;
- To gain a better understanding of post-secondary education financing;
- To obtain more detailed information on knowledge and skills.

Methodology

The National Graduates Surveys were based on a stratified systematic random sample design. For each province, the graduate population was stratified into five education levels: trade/vocational (skilled trades), career/technical (college), undergraduate, master's level and doctorate. The levels were subsequently stratified into nine fields of study for those who had taken a college program and ten fields for trade/vocational and university graduates. These fields of study classifications were based on the 5-digit USIS (University Student Information System) and CCSIS (Community College Student Information System) codes used by Statistics Canada. The sample allocation to the strata was made to assure acceptable levels of detail and therefore acceptable data reliability for the provinces, education levels and fields of study.

A total sample was selected for every cohort of graduates. Interviewers attempted to contact all graduates in the sample, initially using the telephone numbers provided by their institution. On average for every cohort, 73% of the total sample selected were contacted and interviewed. The same individuals were contacted again for the follow-up interview.

Year of graduation	Total sample selected	Year of survey	Usable sample (response rate)
1982	49,150	1984	35,717 (73%)
		1987	31,167
1986	53,136	1988	40,814 (77%)
		1991	35,401
1990	51,111	1992	36,280 (71%)
		1995	35,816
1995	61,759	1997	43,040 (70%)
		2000	To be completed

For more detailed information on methodology, see:

Clark, Warren, Margaret Laing and Edith Rechnitzer (1986). *The Class of 82: Summary Report on the Findings of the 1984 National Survey of the Graduates of 1982*, Secretary of State and Statistics Canada.

Clark, Warren (1991). *The Class of 1986: A Compendium of Findings of the 1988 National Graduates Survey of 1986 Graduates with Comparisons to the 1984 National Graduates Survey*, Employment and Immigration Canada and Statistics Canada, Catalogue LM-198E92.

Little, Don and Louise Lapierre (1996). *The Class of 90: A Compendium of Findings from the 1992 National Graduates Survey of 1990 Graduates*, Human Resources Development Canada and Statistics Canada, Catalogue SC-125-12-96E.

Taillon, Jacques and Mike Paju (1999). *The Class of '95: Report of the 1997 National Survey of 1995 Graduates*, Human Resources Development Canada and Statistics Canada, Catalogue SP-121-04-99.

4.2 Variables Employed in the Analysis

Labour Market Outcomes Variables

Table 4.1 lists the variables selected as indicators of graduates' labour market outcomes. Specifically, income (fjearn), time to find the first job (fjstyy and fjstmm), duration of unemployment (unempmos), job continuity (lwjsty and lwjstm), job full time or part time (jobcl97), job stability (c28), and job satisfaction (c36) will be employed in the factor analysis. Factor scores are constructed based on these variables.

Table 4.1 **Variables of Labour Market Outcomes in First Factor Analysis**

Class of 1995	*Question*
Fjearn	Last week job annual rate of pay. Derived variable indicating the annual rate of pay at the last week job.
Fjstyy	Derived variable indicating the year of start of the first job held after completing reference-year studies.
fjstmm	Derived variable indicating the month of start of the first job held after completing reference-year studies.
unempmos	Derived variable indicating the number of months from the end of reference year studies to the date of start of work for the last week employer.
lwjsty	Derived variable indicating the year of start of the main (or only) last week job. (job continuity)
lwjstm	Derived variable indicating the month of start of the main (or only) last week job. (job continuity)
jobcl97	Is this job full time or part time?
c28	Is this a permanent or temporary position? (job stability)
c36	Considering all aspects of the job you had last week, how satisfied were you with the job?
c37	Considering all aspects of the job you had last week, how satisfied were you with the money you made?

For more detailed information on methodology, see:

Clark, Warren, Margaret Laing and Edith Rechnitzer (1986). *The Class of 82: Summary Report on the Findings of the 1984 National Survey of the Graduates of 1982,* Secretary of State and Statistics Canada.

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c37	Considering all aspects of the job you had last week, how satisfied were you with the money you made?

To produce labour market outcome factor scores, some of the variables in Table 4.1 are recoded. Variable "fjstyy" and "fjstmm" are combined as a single variable which represents the number of years since starting the first job. Similarly, variable "lwjsty" and "lwjstm" are computed as a single variable which represents the number of years since starting (in the last week) their main job. To give the "unempmos" variable a meaning consistent with other criterion variables its values are multiplied by -1, indicating th negative influence of longer periods of unemployment. Variable "jobcl97," "c28," are recoded as dummy variables, where1 indicates full time, permanent employment, and 0 indicates part time, or temporary employment. Factor scores were generated[1] and these scores then were employed as a dependent variable in the regression analysis.

Social Structure Variables

The first set of variables in Table 4.2 index essential aspects of social structure, which includes gender, age, ethnic background, mother's and father's educational attainment, and region of origin.

Table 4.2 **Variables of Social Structure**

Class of 1995	*Question*
gndn	Sex of respondent.
gradage	Derived variable representing age in completed years at the time of completion of reference year studies
visbmin	Derived variable indicating whether the respondent has identified himself/herself as a member of a visible minority ethnic or racial group.
mothed95	Mother's education level relative to the graduate's level at the time of graduation.
fathed95	Father's education level relative to the graduate's level at the time of graduation.
prres	The main region of residence of the graduate during the 12 months before enrolling in the program he/she graduated from.

Notes: For dummy varible "Gndn" and "visbmin," 1=female, 0=male; and 1=visible minority, 0=non-visible minority, respectively. For variable "mothed95" and "fathed95," 1=lower than child's education, 2=equal to child's education, 3=higher than child's education. For variable "prres," 1=Atlantic Provinces, 2=Quebec, 3=Ontario, and 4=West Provinces.

Employability Skills Variables

Table 4.3 describes those items that comprise the employability skills.

[1] This method allows you to save factor scores for use in other analyses. Regression is a method for estimating factor score coefficients. The scores produced have mean of 0 and a variance equal to the squared multiple correlation between the estimated factor scores and the true factor values. The scores may be correlated even when factors are orthogonal (SPSS 10, Users' Guide, 1999).

Table 4.3 **Employability Skills, the Class of '95 in 1997**

Employability Skills	*Possession*	*Acquisition*	*Utilisation*
Writing	(m01)	(m02)	(m04)
Critical Thinking	(m09)	(m10)	(m12)
Solve problems	(m13)	(m14)	(m16)
Work effectively with others	(m21)	(m22)	(m24)
Lead/supervise others	(m25)	(m26)	(m28)
Ability to learn & use new technology	(m29)	(m30)	(m32)

Notes: These are the questions being asked to collect information:
Possession: Would you say your (employability skills) ability is? (four point scale: excellent, very good, good, not very good.)
Acquisition: To what extent did you get this ability from your education or training? (four point scale: to a great extent, to some extent, not much, at all.)
Utilisation: To what extent do you use your (employability skills) ability in your current (main) job? (four-point scale: to a great extent, to some extent, not much, at all.)

4.3 Selection of Cases and Classification of Fields of Study

As described in the previous sections, only university graduates in the NGS are analysed in this research. Hence, selecting cases from NGS is the first step towards conducting the data analysis (Table 4.4). To select the study sample, the first variable used as a criterion for case selection is "level of certification." The result is that only graduates with a bachelor degree are selected.

Table 4.4 **Variables Used for Data Selection**

1982	*1986*	*1990*	*1995*	*Question*
Luncrt82	Vert_lvl	Certlev	certlev	Level of certification, to take into account respondent corrections from a04 to data supplied by institutions.
Fieldst	sam_fos	Respfos	A06H11	Major field of study code for the studies completed, as agreed to by respondents at the time of interview.

In the second step, we select the variable "Major field of study code for the studies completed" as a secondary criterion for filtering the data and selecting cases. As a result, liberal or vocational fields of study are specifically linked to university programs.

It should be noted that most researchers directly use the variable "Fields of Study" from Statistics Canada[2]. However, the variable doesn't reflect programs that are oriented to liberal/vocational fields. In other words, it is not clear which field is directly linked to a job, and which one is not. For example, under the category of "fine arts and humanities," the fields "fine arts," "applied

[2] FOS is usually classified as Education, Fine Arts, Humanities, Social Sciences, Commerce, Agriculture/ Biology, Engineering, Nursing, Other Health, Math/Physical Science.

arts," "English literature," and "translation" are all included. Conventional wisdom would classify these fields as liberal education. However, "applied arts" and "translation" are actually vocational fields. To avoid the confusion, the new variable, fields of study, was created. Based on University Student Information System (USIS) Field of Study Codes, Table 4.5 lists the five major categories of fields of study as: (1) Liberal Arts and Social Sciences, (2) Liberal Sciences, (3) Education, (4) Applied Arts and Social Sciences, and (5) Applied Sciences. To address how university students have responded to the changing workplace through selecting fields of study, either in liberal or vocational areas, the five fields of study are regrouped, so that (1) and (2) are merged as liberal, and (3), (4), and (5) are combined as vocational. The fields of study will be separately analysed by educational background at the university entry level (e.g., entry from high school, college and trade-vocational school, or university).

Table 4.5 **Classification of Liberal and Vocational Education (USIS)**

Liberal	*Vocational*		
I. Liberal Arts /Social Sciences	**III. Education**	**V. Applied Sciences**	
8 Fine Arts 9 Music 14 Classics, Classical and Dead Languages 15 History 18 English Language and Literature 19 French Language and Literature 20 Other Languages and Literature 21 Philosophy 22 Religious Studies 23 Other Humanities 25 Anthropology 28 Economics 29 Geography 32 Political Science 33 Psychology 34 Sociology 36 Other Social Sciences 100 Arts, N.E.C.	1 Teaching 2 Education Support 3 Physical Education & Recreation 5 Counselling Services	48 Veterinary Medicine \Science 52 Architecture 53 Aeronautical & Aerospace Engineering 54 Chemical Engineering 55 Civil Engineering 56 Design \Systems Engineering 57 Electronic & Electrical Engineering 58 Industrial Engineering 59 Mechanical Engineering 60 Mining & Metallurgical Engineering 61 Engineering - Other 62 Engineering Science 63 Forestry, Fisheries & Wildlife Management 64 Landscape Architecture 76 Dentistry 77 Medicine – General	78 Medicine - Basic Medical Science 79 Medical Specialities (non-surgical) 80 Paraclinical Sciences 82 Nursing 84 Optometry 85 Pharmacy & Pharmaceutical Sciences 86 Public Health 87 Rehabilitation Medicine & Therapy 88 Medical Laboratory & Treatment Tech 90 Other Health Professions, Sciences & Tech 91Computer Science 96 Meteorology 97 Oceanography
II. Liberal Sciences	**IV. Applied Arts /Social Sciences**		
26 Archaeology 40 Agricultural Science 43 Biochemistry 44 Biology 45 Biophysics 46 Botany 49 Zoology 92 Chemistry 93 Geology 94 Math, Actuarial Science 98 Physics 101 Sciences, N.E.C.	10 Performing Arts 12 Graphic Arts, Audio/ visual Arts and Design 16 Library and Records Science 17 Mass Media Studies 27 Area Studies (non-languages or literatures) 30 Law and Jurisprudence 31 Man \ Environment Studies 35 Social Work and Social Services 37 Specialised Administration Studies 38 Commerce \Business 39 Secretarial Science - General Fields 47 Household Science and Related Fields		

5. Mapping Graduates' Labour Market Realities

5.1 Historical Trends

In this analysis we identify field of study as one of the most important characteristics that lead graduates to successfully integrate into the labour market. Before we report our findings, it is first instructive to employ the various NGS cohorts to illustrate changes that have occurred among young adults in their choices of liberal and vocational fields of study in Canada. Figure 5.1 shows that university graduates chose predominantly vocational fields of study from the period ranging from 1982 to 1995. The vocational choice ranged from a high of 60.5 percent in 1982 to a low of 56 percent for the subsequent NGS cohort in 1986. Since 1986 the proportion of university graduates in vocational fields of study has remained relatively stable, increasingly modestly by 1.3 percent for the university graduate cohort in 1995.

Figure 5.1 **Trends of University Undergraduate Education in Canada, the classes of 1982 to 1995**

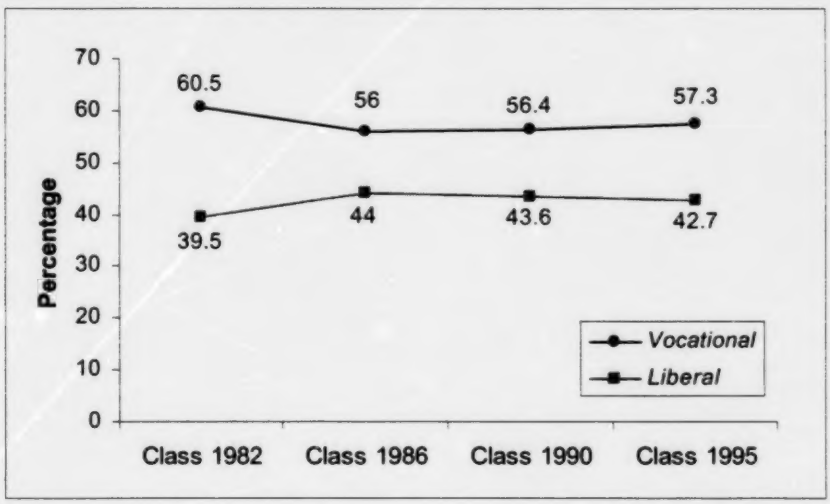

Table 5.1 presents the categorisation of five fields of study that was previously described for university graduates between the period of 1982 to 1995 and reveals shifts in choice not indicated in Figure 5.1.

Table 5.1 **Fields of Study of University Undergraduate Graduates 1982-1995 (five categories)**

Class	*1982*		*1986*		*1990*		*1995*	
Fields of Study	Freq	%	Freq	%	Freq	%	Freq	%
Liberal arts/social sciences	25363	30.5	31029	29.9	34835	33.3	44364	33.2
Liberal sciences	7451	9.0	14617	14.1	10823	10.3	12753	9.5
Education	15177	18.2	14702	14.0	17682	16.9	23876	17.8
Applied arts/social sciences	19682	23.7	24248	23.1	24154	23.1	30847	23.1
Applied science	15492	18.6	19260	18.4	17142	16.4	21943	16.4
Total n	83166	100	103909	100	104637	100	133783	100.0
Missing Case	740		978		341		242	

We observe in Table 5.1 that the traditional Liberal Arts and Social sciences, rather than becoming less attractive to university students, demonstrated an appeal, increasing from 30.5 percent in 1982 to 33.2 percent in 1995. Both Liberal Sciences (e.g., biochemistry, geology, biology) and Education show variations in appeal from 1982 to 1995, most likely in response to shifts in employment demand within these fields and changes in the larger economic environment. Thus, Liberal Sciences have consistently attracted at least 9 percent of graduates from 1982 to 1995, with the largest proportion of graduates (14.1%) choosing these fields in 1986. Education has generally proven a more popular choice among university graduates with at least 17 percent selecting this field in all years except 1986, when the proportion dipped to 14 percent. The Applied Science fields (e.g. veterinary medicine, civil engineering, dentistry) appear to have been slightly more popular in earlier decades, with more than 18 percent choosing these fields in the 1980s and approximately 16 percent selecting similar fields in the 1990s.

As Mouelhi (1995:40) noted, the pattern of enrolment growth since 1970 varies considerably by major fields of study with the social sciences having made the strongest gains. The short boom of liberal education from the mid 1980s to the 1990s resulted from a higher demand for a university education, especially among women (Wannell & Charon, 1995). As a relatively inexpensive strategy for meeting increased student demand, expanding liberal education, especially in the areas of social sciences and humanities, was seen as a solution. Providing students with a liberal arts education was relatively less expensive than training them in vocational fields (Allen, 1998).

5.2 Summary of Labour Market Outcomes

The historical overview of fields of study enrolments provides us with a good understanding of the variations that exist between vocational and liberal education areas. In this section we examine the relationship between fields of study choice and labour market outcomes for the class of '95. Table 5.2 provides an overview of outcomes in terms of the five general fields of study categories that were described previously. Liberal arts and social science graduates do less well than their liberal science colleagues on nearly all criteria. Graduates in Applied Sciences earned significantly higher incomes ($32,641) than graduates in Liberal Arts and Social Sciences ($19,592), Liberal Sciences ($22,105), Education ($24,047) or Applied Arts and Social Sciences ($26,648). Graduates in Education (5.3%) and Applied Sciences (5.9%) had the lowest unemployment rates, while graduates in Liberal Sciences experienced the highest level of unemployment (13.3%); they were followed closely by graduates in Liberal Arts and Social Sciences (12.3%). Graduates in the Applied Arts/Social Sciences and Applied Sciences were also more likely to locate full time/permanent employment than graduates in other fields.

Table 5.2 **Summary of Fields of Study Choice and Outcomes, the Class of '95 in 1997**

Class	*1995*						
Variable	*FJEARN*	*LFSTAT97*	Jobcl97	C28	C35	C36	K21
Fields of Study (five categories)	Income	UR	Job Full Time	Job Permanent	Job closely related to studies	Very satisfied with job	Select same FOS? (yes)
Liberal arts/ social sciences	$19,592	12.3	74.5	69.9	24.3	35.3	62.1
Liberal sciences	$22,105	13.3	82.8	64.9	35.8	39.7	62.0
Education	$24,047	5.3	75.2	58.4	69.3	55.3	79.6
Applied arts/ social sciences	$26,648	9.3	90.9	79.9	55.8	39.9	76.5
Applied science	$32,641	5.9	90.6	81.7	68.5	46.2	80.6
Overall Average	$24,474	9.3	82.1	71.6	49.5	42.7	71.6

Note: UR stands for Unemployment rates that exclude the graduates who were not in the labour force.
All above indicators refer to the job in the reference week (May-June, 1997).

Education graduates at the time of graduation faced a very restricted job market and this is evident in the amount of part-time, temporary work they received. Graduates from Education (69.3%) and Applied Sciences (68.5%) were the most likely to claim that their jobs was closely related to their previous studies, while graduates in Liberal Arts and Social Sciences (24.3%)

were the least likely to express this sentiment. Consistent with these findings was the degree of satisfaction expressed by graduates. Thus, graduates in Education were the most satisfied (55.3%), while graduates in Liberal Arts and Social Sciences appeared the least satisfied (35.3%). Graduates in Liberal Arts/Social Sciences were more likely to experience negative labour market returns. Finally, gradates in Applied Sciences (80.6%) and Education (79.6%) appeared to be most committed to their fields of study, indicating that they select these fields again. Liberal Science (62%) and Liberal Arts and Social Science graduates were the least likely to report that they would repeat their fields of study.

5.3 Snapshots of Specific Fields of Study

By using seven indicators,[3] Table 5.3 provides a snapshot for each field of study for graduates of the class of 95 in 1997. It should be noted that there is a significant variation *within* both liberal and vocational fields. For instance, within Liberal Arts and Social Sciences, graduates from Other Humanities (i.e. fields not covered by mainstream categories) earned the highest employment income ($35,044), and those from Classical and Dead Languages earned significantly lower incomes ($9,465). Similarly, while graduates from Other Humanities experienced no unemployment after graduation, 24.1 percent of the graduates from Classical and Dead Languages and 18.4 percent from English and Literature had experienced periods of unemployment. In terms of job security, graduates from Economics (83.6%) were more likely to have permanent jobs than university graduates from Classical and Dead Languages (51.3%), French Language and Literature (57.5%) and Philosophy (58.3%). Fully 92.6 percent of the graduates in Other Humanities were found to be employed full time, while only 30.3 percent of the graduates in Classical and Dead Languages, and 48.5 percent of the Music graduates held full-time positions. Philosophy (6.6%) graduates and graduates from Other Languages and Literature (7.3%) were the least likely to claim that their jobs were closely related to their field of study, while Religious Studies graduates (58%) were the most likely to claim that their jobs were closely related to their studies. While 45.9 percent of graduates in French Language and Literature reported that they were very satisfied with their jobs, no similar claims were made by graduates in Classical and Dead Languages.

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[3] These include 1) income, 2) unemployment rate, 3) full/part time employment, 4) permanent/ temporary job, 5) if job is closely related to FOS, 6) very satisfied with job, and 7) select the same FOS.

Table 5.3 **Snapshot of Fields of Study through Labour Market Outcomes and Educational Returns, the Class of '95 in 1997**

	USIS	Field of Study	WTD Case	Average Income	Un-employed	Job Full Time	Job Permanent	Job related to study	Very satisfied with job	Select same FOS
Liberal Arts and Social Sciences	23	Other Humanities	464	$35,044	0.0	92.6	72.1	38.8	36.5	78.9
	22	Religious Studies	1,226	$24,729	7.7	75.1	72.2	58.0	40.6	91.3
	28	Economics	2,942	$21,449	14.1	89.5	83.6	25.3	32.0	55.7
	25	Anthropology	1,069	$21,209	9.5	75.9	72.7	16.6	17.2	74.5
	29	Geography	3,135	$21,071	8.9	84.9	70.7	10.0	42.3	53.9
	100	Arts, N.E.C.	1,439	$20,656	11.3	79.4	73.5	26.1	43.9	64.0
	21	Philosophy	848	$20,355	1.5	79.8	58.3	6.6	31.1	70.7
	32	Political Science	3,254	$19,776	11.0	85.8	72.3	18.4	31.6	59.3
	20	Other Lang & Literature	1,429	$19,748	4.5	69.2	67.1	7.3	23.3	63.2
	15	History	3,840	$19,221	9.5	75.0	60.4	12.0	38.7	56.6
	18	English Lang & Literature	4,211	$18,860	18.4	69.4	61.4	21.8	34.5	58.2
	34	Sociology	5,915	$18,723	8.3	73.9	71.1	23.8	33.3	54.2
	33	Psychology	9,423	$18,560	11.0	68.3	72.3	31.0	34.7	61.8
	19	French Lang & Literature	2,411	$18,390	11.0	67.2	57.5	45.0	45.9	72.8
	9	Music	1,316	$17,800	12.2	48.5	77.0	39.1	32.8	86.6
	8	Fine Arts	1,239	$17,594	11.2	79.6	83.4	11.9	45.3	74.4
	14	Classics, Classical & Dead Languages	203	$9,465	24.1	30.3	51.3	26.5	0.0	44.6
Liberal Sciences	26	Archaeology	53	$36,796	0.0	85.1	83.0	14.9	14.9	49.1
	93	Geology	366	$30,631	13.9	82.3	80.3	67.8	64.6	67.2
	40	Agricultural Science	511	$27,945	4.5	94.9	84.8	61.4	52.4	78.3
	94	Math, Actuarial Science & Applied Math	1,732	$25,628	8.1	91.3	78.2	41.2	46.8	61.6
	101	Sciences, N.E.C.	1,478	$23,618	9.9	70.1	64.0	42.5	34.3	70.8
	92	Chemistry	1,080	$22,976	10.3	88.7	69.8	35.7	52.5	60.9
	98	Physics	714	$22,357	14.3	81.4	52.4	36.8	33.7	60.3
	43	Biochemistry	1,084	$20,577	10.2	79.2	56.0	31.3	39.0	56.6
	46	Botany	55	$19,198	16.4	84.6	50.0	28.9	21.6	77.4
	44	Biology	4,815	$18,669	12.4	82.3	58.3	24.4	33.6	60.5
	49	Zoology	272	$17,526	7.3	83.0	39.9	24.0	24.5	47.1
	99	Arts & Sciences, N.E.C.	591	$29,169	5.6	81.0	80.6	63.7	55.4	56.7

Table 5.3 (continued)

USIS		Field of Study	WTD Case	Average Income	Un-employed	Job Full Time	Job Permanent	Job related to study	Very satisfied with job	Select same FOS
Education	1	Teaching	19,289	$25,183	4.7	75.2	58.5	73.2	56.4	80.1
	5	Counselling Services	121	$24,537	9.9	98.9	23.6	2.2	80.0	28.9
	2	Education Support	1,239	$23,501	4.3	73.8	59.5	62.2	43.5	74.1
	3	Physical Education & Recreation	3,228	$17,135	7.3	74.8	58.0	47.8	51.7	81.0
Applied Arts and Social Sciences	27	Area Studies (non-languages/ literatures)	532	$30,273	21.8	81.6	77.1	20.5	43.1	73.5
	30	Law & Jurisprudence	3,839	$28,438	19.8	93.3	62.8	70.7	47.3	75.6
	38	Commerce\Business\Management	18,137	$27,621	6.0	93.4	85.4	57.7	40.0	79.4
	12	Graphic Arts, A. V. Arts & Design	710	$27,429	12.3	77.8	70.7	39.9	51.7	79.9
	35	Social Work & Services	2,289	$26,148	1.7	82.6	62.6	78.8	45.0	81.3
	37	Specialized Admin Studies	577	$25,744	0.9	96.7	86.5	39.1	32.6	58.2
	17	Mass Media Studies	1,687	$25,204	12.3	87.3	79.5	36.6	29.8	78.7
	16	Library & Records Science	145	$23,535	0.0	100	76.6	20.5	30.1	41.8
	31	Man\ Environment Studies	1,353	$23,447	15.6	88.1	85.0	35.6	42.6	65.3
	47	Household Science & Related Fields	817	$16,492	16.6	77.4	66.5	36.5	29.1	44.0
	39	Secretarial Science - General Fields	62	$15,017	27.4	100	81.8	18.2	18.2	59.0
	10	Performing Arts	698	$14,730	10.0	74.1	39.6	16.5	11.4	70.6
Applied Sciences	84	Optometry	94	$59,646	0.0	100	*	*	*	100
	76	Dentistry	326	$53,628	4.3	87.1	100	100	72.6	92.2
	85	Pharmacy & Pharmaceutical Sciences	811	$36,864	3.8	87.7	95.5	94.0	43.4	81.3
	60	Mining & Metallurgical Engineering	252	$36,812	1.6	100	97.9	51.0	35.1	60.1

Table 5.3 (continued)

	USIS	Field of Study	WTD Case	Average Income	Un-employed	Job Full Time	Job Permanent	Job related to study	Very satisfied with job	Select same FOS
Applied Sciences	77	Medicine - General	1,734	$36,146	11.9	97.6	35.1	88.7	62.7	93.1
	62	Engineering Science	181	$35,723	12.7	100	96.8	32.8	37.6	67.3
	48	Veterinary Medicine\ Science	253	$35,448	4.7	100	80.4	80.9	59.4	76.3
	57	Electronic & Electrical Engineering	1,576	$35,296	6.9	98.9	90.0	50.1	45.8	84.0
	86	Public Health	660	$35,286	6.1	82.6	90.6	60.5	37.2	84.3
	90	Other Health Professions, Sciences & Tech.	643	$34,506	7.5	78.2	89.0	61.3	42.6	85.0
	59	Mechanical Engineering	1,857	$33,596	1.0	97.9	91.0	60.6	44.7	84.6
	91	Computer Science	3,230	$33,420	3.2	95.5	89.1	73.3	46.6	91.4
	79	Medical Specialities (non-surgical)	61	$33,266	11.3	48.8	81.1	91.7	16.2	77.4
	63	Forestry, Fisheries & Wildlife Management	315	$33,178	11.7	100	76.9	64.2	29.8	74.6
	53	Aeronautical & Aerospace Engineering	94	$31,711	2.1	97.6	94.0	45.8	66.3	62.0
	87	Rehabilitation Medicine & Therapy	1,073	$30,992	6.3	88.3	72.8	93.0	56.1	94.0
	54	Chemical Engineering	719	$30,972	8.2	96.5	86.8	53.2	53.7	68.1
	58	Industrial Engineering	296	$29,922	0.0	100	93.9	62.7	56.3	86.8
	55	Civil Engineering	1,275	$29,835	3.8	97.0	82.6	61.8	44.7	61.2
	82	Nursing	3,665	$29,827	2.4	75.2	83.4	70.5	40.9	72.1
	61	Engineering - Other	1,528	$29,801	4.9	94.4	79.8	62.3	43.3	80.6
	64	Landscape Architecture	80	$29,255	28.4	100	75.0	75.0	25.0	100
	96	Meteorology	15	$28,789	0.0	100	53.3	33.3	20.0	80.0
	56	Design\Systems Engineering	69	$28,720	0.0	50.0	32.0	32.0	68.0	100

Table 5.3 (continued)

USIS		Field of Study	WTD Case	Average Income	Un-employed	Job Full Time	Job Permanent	Job related to study	Very satisfied with job	Select same FOS
Applied Sciences	52	Architecture	482	$27,251	11.2	97.3	81.1	65.8	40.4	72.4
	97	Oceanography	10	$24,900	50.0	100	100	100	100	100
	88	Medical Laboratory & Treatment Tech.	89	$19,736	7.9	67.7	100	21.5	43.1	43.3
	80	Paraclinical Sciences	140	$19,201	0.0	100	12.5	27.3	12.5	66.4
	78	Medicine-Basic Medical Science	412	$17,028	27.7	82.5	63.7	34.2	35.4	47.1

When asked if they would repeat the same field of study, 91.3 percent of graduates from Religious Studies and only 44.6 percent of Classical and Dead Languages graduates indicated they would.

Among graduates from Liberal Sciences, average yearly incomes ranged from $36,796 for Archaeology graduates; $30,631 for Geology graduates; $27,945 for Agricultural Science graduates: $20,577 for Biochemistry graduates; and $17,526 for Zoology graduates. Botany graduates had the highest unemployment rate (16.4%) while Agricultural Science graduates only had an unemployment rate of 4.5 percent. Though none of the Archaeology graduates were unemployed, only 14.9 percent held jobs related to their field of study. While a high proportion of graduates from Agricultural Sciences (94.9%) and Mathematics (91.3%) were employed full time, fewer General Sciences graduates (70.1%) held full-time jobs. In terms of security, graduates from Agricultural Sciences (84.8%) were more likely to have permanent jobs, while Zoology graduates (39.9%) were less likely to have permanent jobs. Most of the Geology graduates (64.6%) were very satisfied with their jobs, but less than two in ten of the Archaeology graduates (14.9%) were very satisfied, which suggests that higher income does not always go hand in hand with job satisfaction. Over seven in ten (76.1%) of the Botany graduates reported excellent writing skills, but only 34.1 percent of graduates from Mathematics, Actuarial Science & Applied Mathematics made that claim. Over six in ten of the Physics graduates (63.7%) reported that they have an excellent ability to think critically, slightly more than three in ten of Zoology graduates claimed the same. While 77.4 percent of the graduates from Botany said that

they would repeat their field of study, only 47.0 percent of the Zoology graduates were willing to do so.

Unlike other fields, Education graduates are less stratified, simply because education is the jurisdiction of provincial governments. Graduates from Teacher Education earned the most ($25,183), and those from Physical Education and Recreation earned the least ($17,135). Overall, they had lower unemployment and fairly stable jobs. Over 73 percent of Teacher Education graduates believed their jobs were closely related to their field of study, and 80.1 percent of them claimed they would repeat their studies. Surprisingly, although Physical Education graduates earned the least, most of these graduates (81.0%) were willing to do it again.

Within Applied Arts and Social Sciences, graduates from Area Studies (non-language/literatures) earned the most ($30,273), while those from Performing Arts made the least ($14,730). No graduates from Library and Record Science reported being unemployed, but 27.4 percent of Secretarial Science graduates were unemployed. However, in terms of job stability and continuity, Secretarial Science graduates were all employed full time (100%), and most of them held permanent positions (81.8%). A majority of the graduates from Social Work and Services (78.8%) reported that their jobs were closely related to their studies, but less than two in ten (16.5%) of the Performing Arts graduated reported this. While 51.7 percent of Graphic Arts graduates were very satisfied with their jobs, only 11.4 percent of Performing Arts graduates were very satisfied. A majority of Law graduates (63.7%) thought that they had excellent writing skills, and 60.5 percent of them claimed that they had an excellent ability to thinking critically. On the other hand, Library and Record Science graduates were not very confident in their ability to write well and think critically. Not one graduate in this field reported having excellent writing skills and only 20.5 percent of them claimed that they could think critically. Graduates from Social Work and Services (81.3%) were the most loyal to their field of study, but only 41.8 percent of Library and Record Science graduates stipulated that they would repeat their studies in this area.

Compared to graduates from other fields of study, the employment outcomes for graduates from Applied Sciences varied widely. Optometry graduates had the highest average income ($59,646), while those from Basic Medical Science earned the least ($17,028). Graduates from several fields

reported no unemployment (Optometry, Industrial Engineering, Meteorology, and System Engineering), but 28.4 percent of Landscape Architecture graduates and 27.7 percent from Basic Medical Science were unemployed.[4] In general, graduates from most Engineering and Medical Health fields enjoyed job security and continuity. However, only 48.8 percent of graduates from Medical Specialities were employed full time, and 12.5 percent of Paraclinical Sciences graduates had permanent employment. All Dentistry graduates claimed that their jobs were closely related to their studies, but only 21.5 percent of the graduates from Medical Laboratory reported that this was true. Over seven in ten Dentistry graduates (72.6%) stated that they were very satisfied with their jobs, but only 12.5 percent of Paraclinical Sciences graduates mentioned this. More than 60 percent of Landscape Architecture graduates and 47.9 percent of Industrial Engineering graduates claimed that their writing ability was excellent, but only 13.7 percent of Engineering Science and Paraclinical Sciences graduates made that claim. While 81.9 percent of Optometry graduates and 65.1 percent of Industrial Engineering graduates reported that their ability to think critically was excellent, only 17.1 percent of Public Health graduates made the same statement. Graduates from Optometry, Landscape Architecture, System Engineering, and Oceanography were one hundred per cent committed to their field of study, but only 43.3 percent of Medical Laboratory and 47.1 percent of Basic Medical Science graduates were willing to repeat their studies.

[4] The unemployment situation may be overestimated for the graduates from Oceanography because of a smaller n.

6. School-Work Transitions

6.1 The Role of Structure and Agency

In examining the implications of fields of study choice, the first task is to determine the roles of agency – defined in this study as choice of a liberal or vocational field of study – and structure in predicting labour market outcomes. We assume that social structural variables will influence labour market outcomes. However, we also expect agency to be a salient factor in determining those outcomes. Table 6.1 presents results from the regression of structural and agency variables on the factor score generated from selected labour market outcomes indicators.

Table 6.1 **Regression for Labour Market Outcomes with Structure and Agency Variables the Class of '95**

Dependent Variable	*Factor Score: Labour Market Outcomes*		
Independent Variable	Beta	Std. Error	t
Female	-0.02*	0.019	-2.9
Age	0.46*	0.001	57.9
Visible Minority	-0.02	0.029	-1.9
Mother's Education	0.01	0.019	1.4
Father's Education	-0.04*	0.015	-4.4
Quebec	0.09*	0.033	7.3
Ontario	0.03	0.032	2.4
West	0.03	0.034	2.1
Liberal Fields of Study	-0.03*	0.019	-4.3
(Constant)		0.054	-35.4

Notes: Dummy variables: Sex: female=1 male=0; Ethnicity: visible minority=1 other=0; Fields of study: liberal=1 vocational=0.
For regression with labour market outcomes: Multiple R=.491, R Square=.241, F=464.8, p<.01.
An asterisk indicates beta significant at p <.01.

The results indicate that structural variables are related to labour market outcomes. Most of the variation in the factor score is captured by the age variable. To the extent age is acting as a proxy for greater life experience and more specifically work experience, one would expect that any index of labour market position would be sensitive to this individual difference variable. While the remaining structural variables are somewhat displaced by age, there is obvious predictive strength in gender and father's educational level. Gender patterns in fields of study choice are well established an frequently parallel employment preferences and constraints in the labour force (Bakker, 1991). Regional effects focussed on Quebec likely reflect the unique relationship

between that province's post-secondary institutions and the labour market (Jones, 1997). Of particular interest to this study is the significant position of fields of study choice in the equation. This result indicates that agency does play a role in determining the labour market position of graduates, at least for the period covered by the NGS.

Table 6.2 **Social Structure and Labour Market Outcomes by Fields of Study the Class of '95**

Dependent Variable		*Liberal*			*Vocational*		
Independent Variable		Mean	N	SD	Mean	N	SD
Sex	Male	2.84	2,001	1.38	3.28	3,163	1.36
	Female	2.74	3,613	1.40	3.08	4,372	1.43
Age	24 or less	2.62	3,823	1.31	2.88	4,053	1.33
	25 and older	3.10	1,794	1.49	3.49	3,488	1.42
Ethnicity	Visible minority	2.67	598	1.25	3.05	840	1.36
	Non Visible Minority	2.77	4,248	1.41	3.18	5,769	1.42
Mother's Education	Less than child's education	2.83	4,201	1.41	3.18	6,046	1.42
	Equals to child's education	2.58	875	1.28	3.05	955	1.37
	Higher than child's education	2.65	379	1.34	3.07	303	1.37
Father's Education	Less than child's education	2.84	3,702	1.42	3.24	5,246	1.42
	Equals to child's education	2.70	957	1.35	2.97	1,207	1.36
	Higher than child's education	2.61	756	1.26	3.04	746	1.38
Region of Origin	Atlantic	2.46	496	1.30	2.80	601	1.36
	Quebec	2.93	1,137	1.47	3.31	2,886	1.47
	Ontario	2.78	2,586	1.39	3.03	2,280	1.35
	West	2.78	1,274	1.34	3.21	1,678	1.35

Notes: Mother's education and father's education are the variables to compare with child's education.
Factor scores are presented as quintiles.

Table 6.2 reveals the relationship between structure-agency and labour market outcomes in terms of liberal and vocational fields of study. When evaluated in terms of structural indicators, the overall returns to an investment in education are clearly greater for vocational graduates than for those who chose the liberal stream. There are, however, some interesting differences within each of the liberal and vocational categories. Proportionately more females choose the vocational stream.[5] A significant segment of the female vocational enrolment is found in faculties of education. In both liberal and vocational fields of study, visible minorities fare worse in the

[5] In terms of absolute numbers, however, there are more females in the vocational stream. This reflects the majority of females in university undergraduate education in Canada.

school-work transition than do non-visible minorities. Anisef, Sweet, James, and Lin (1999) report a similar finding although there were some notable exceptions across fields of study in that study. Father's Education can be considered an indicator of the availability of family cultural and social capital that presumably offers both post-secondary and labour market advantages (Andres, 1993). However, we find better outcomes for those whose parents had a lower level of education than the respondent (i.e. less than a baccalaureate degree). Conceivably, this disadvantage in family capital is offset by a greater motivation to succeed. In any event, the finding is consistent with more general studies of social position that finds that social origin diminishes in importance beyond high school years. Regional differences are noted between Quebec and other provinces but not further explored in this report.

6.2 The Relationship between Fields of Study and Labour Market Outcomes

The previous analyses established the role of agency (fields of study choice) in shaping labour market outcomes. In this section, we undertake a closer examination of the relationship between fields of study and labour market outcomes. Comparisons of the latter are made between liberal and vocational fields of study categories. As well, a more detailed account of outcomes is given by exploring the liberal and vocational categories to include Liberal Arts and Social Sciences, Liberal Sciences; as well as Education, Applied Arts and Social Sciences, and Applied Sciences.

Table 6.3 presents the initial liberal-vocational comparison of employment, income, continuity and stability, and job satisfaction. Quite clearly, the returns to vocational graduates exceed those of liberal graduates. The income differential is over $7,000 higher for vocational graduates; and the employment situation of vocational graduates is better – they suffer half the unemployment and half the part-time work status as compared to liberal graduates. They also have a markedly lower rate of temporary employment. These advantages result in higher levels of job satisfaction, although not in proportion to the objective indicators of their employment situation.

Table 6.3 **Fields of Study and Labour Market Outcomes (two categories)**

Fields of Study	*Liberal* %	*Vocational* %
Labour force status		
Employed	87.5	92.9
Unemployed	12.5	7.1
Column Employed	4,820	7,111
Annual job income		
Mean	$20,156	$27,521
Standard Deviation	$13,399	$15,828
Column Total	4,244	6,013
Is the job full time(= or > 30 hours per week) or part time?		
Full time	76.2	85.8
Part time	23.8	14.2
Column Total	4,146	6,544
Is the job permanent or temporary?		
Permanent	68.8	73.3
Temporary	31.2	26.7
Column Total	3,878	6,179
Job satisfaction		
Very dissatisfied	2.9	1.6
Dissatisfied	12.2	7.8
Satisfied	48.7	43.8
Very satisfied	36.2	46.8
Column Total	3,870	6,192

Our examination of the direct links between fields of study choice and labour market outcomes does not support previous research on university preparation for the workforce, which tends to favour the more liberally educated graduate, at least at the baccalaureate level. Because of the limited time interval between graduation and data collection with the NGS differences of this sort were not found. The differences found in our study may not be sustained. Indeed, the work of Allen suggests they will diminish and even reverse. Nevertheless, in the context of the school-work transition period examined in this study, labour market outcomes favour vocational graduates.

7. Employability Skills

Employability skills have been identified as important in the post-industrial workplace by the Conference Board of Canada (1998). These comprise communication skills (writing and speaking); interpersonal skills (working effectively with others, and leading/supervising others); and innovative skills (critical thinking, solving problems and learning & using new technology).

The previous analysis gave some indication of how graduates are differentially rewarded in the market place. We found clear evidence that the labour market favours vocational over liberal graduates. To further explore the basis for these differences, we introduce the second question: Do the employability skills possessed, acquired and utilized by university graduates enrolled in liberal and vocational fields of study differ significantly?

Assessment of the employability skills among university graduates are based on three components: possession, acquisition, and utilization. Skills possession indicates graduates' belief that they possess these skills, while skills acquisition refers to their assessment of the degree to which they acquired these skills as a consequence of their university education, and finally, skills utilization refers to their opportunity to apply these skills in their current job.

7.1 Employability Skills Possession

Table 7.1 sets out the graduates' ratings of the extent to which they possess the listed employability skills in relation to the different labour market outcomes of liberal and vocational graduates. The mean ratings shown in the table reveals there is very little difference between the groups.

Table 7.1 **Fields of Study and Employability Skills Possession (two categories)**

Fields of Study	*Liberal*			*Vocational*			*Total*		
Skills Possession	Mean	N	SD	Mean	N	SD	Mean	N	SD
Writing (m01)	3.32	5,551	0.7	3.20	7441	0.73	3.25	12,992	0.72
Critical thinking (m09)	3.27	5,545	0.69	3.26	7445	0.67	3.27	12,990	0.68
Solve problems (m13)	3.13	5,535	0.69	3.18	7432	0.67	3.16	12,967	0.68
Work effectively with others (m21)	3.36	5,533	0.72	3.38	7432	0.69	3.37	12,965	0.7
Lead/supervise others (m25)	2.94	5,409	0.79	2.94	7083	0.79	2.94	12,492	0.79
Ability to learn & use new tech. (m29)	3.05	5,461	0.85	3.15	7383	0.81	3.11	12,845	0.83

Note: The variables are recoded in a reversed order, 1=not very good, 2=good, 3=very good, and 4=excellent, so a higher score indicates a higher level of skill.

Table 7.2 shows the ratings across the five fields of study comprising the liberal and vocational categories and reinforces the finding of uniformity in skill ratings. There appear to be some differences among the five fields of study in terms of these skill areas but what variability exists is as present within one of the broad groupings as between. For example, Liberal arts graduates rate themselves higher than applied arts graduates but education graduates offer higher ratings than either. Education graduates are, however, consistently different in the social skills area – leadership and inter-personal relationships. This is, perhaps, to be expected as faculties of education emphasise these areas and more importantly, provide opportunities for their students to practice these skills in their student-teaching practica.

Table 7.2 **Fields of Study and Employability Skills Possession (five categories)**

FOS	*Liberal Arts/ Social Sciences*			*Liberal Sciences*			*Education*			*Applied Arts/ Social Sciences*			*Applied Sciences*		
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
(m01)	3.35	4,314	0.68	3.2	1,237	0.76	3.33	2,330	0.68	3.18	2,987	0.74	3.07	2,125	0.76
(m09)	3.25	4,308	0.69	3.31	1,237	0.70	3.26	2,330	0.66	3.25	2,993	0.68	3.29	2,122	0.67
(m13)	3.10	4,299	0.69	3.24	1,236	0.69	3.18	2,323	0.68	3.14	2,985	0.66	3.23	2,124	0.67
(m21)	3.37	4,298	0.72	3.31	1,235	0.72	3.50	2,322	0.62	3.35	2,986	0.71	3.31	2,123	0.71
(m25)	2.96	4,197	0.78	2.86	1,211	0.81	3.16	2,217	0.76	2.88	2,819	0.78	2.78	2,047	0.77
(m29)	3.04	3,193	0.99	3.02	809	0.98	3.41	1,979	0.84	2.99	2,345	1.00	3.08	1,727	0.89

Note: m01=Writing; m09=Critical thinking; m13=Solve problems; m21=Work effectively with others; m25=Lead/supervise others; m29=Ability to learn & use new technology.

The finding of little or no difference between the liberal and vocational groups is somewhat surprising given the vociferousness of the debate surrounding liberal and vocational education and the related debate around developing a broad knowledge rather than a more obviously job-relevant set of skills.

7.2 Employability Skills and Acquisition

Employability skills acquisition evaluates whether universities are adequately preparing their graduates. Some employers (or employers' groups) tend to be critical of all aspects of the university's role in preparing graduates for employment, effectively limiting the potential of forming a partnership (Fisher, Rubenson & Schuetze, 1994; CAUT, 2000).

Table 7.3 outlines graduates' attributions of their employability skills. The ratings are moderately high, suggesting that universities – in both liberal and vocational fields of study – play a role in

forming these skills. This is especially the case in the intellectual sphere: composing one's thoughts in written form, solving problems and thinking critically. Universities are relatively less effective in providing opportunities for students to acquire skills in teamwork and leadership. In addition, university education is not adequately prepared students with advanced technological skills.

Table 7.3 **Fields of Study and Employability Skills Acquisition (two categories)**

Fields of Study	*Liberal*			*Vocational*			*Total*		
Skills Acquisition	Mean	N	SD	Mean	N	SD	Mean	N	SD
Writing (m02)	3.46	5,512	0.69	3.28	7,372	0.77	3.36	12,884	0.74
Critical Thinking (m010)	3.45	5,504	0.63	3.35	7,408	0.68	3.39	12,911	0.66
Solve problems (m14)	3.15	5,501	0.73	3.20	7,410	0.73	3.18	12,911	0.73
Work effectively with others (m22)	2.74	5,483	0.93	2.90	7,406	0.91	2.83	12,889	0.92
Lead/supervise others (m26)	2.57	5,281	0.97	2.66	6,901	0.92	2.62	12,182	0.94
Ability to learn & use new tech. (m30)	2.77	5,238	0.99	2.87	7,177	0.93	2.83	12,415	0.96

Notes: The variables of employability skills are recorded in a reversed order, 1=not very good, 2=good, 3=very good, and 4=excellent, so a high score indicates a high level of skills.
The question is "To what extent did you get this ability from your education or training?" The variables are recoded in which 1=not at all, 2=not much, 3=to some extent, and 4=to a great extent.

Table 7.4 provides a more concentrated look at the variation in skills imparted to graduates. Across the five fields of study contained in the Table, one can see a greater variation in graduates' assessment of their university experience. These differences are not, however, obvious between the fields of study that comprise liberal and vocational categories.

Table 7.4 **Fields of Study and Employability Skills Acquisition (five categories)**

FOS	*Liberal Arts/ Social Sciences*			*Liberal Sciences*			*Education*			*Applied Arts/ Social Sciences*			*Applied Sciences*		
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
(m02)	3.51	4,285	0.65	3.27	1,228	0.78	3.37	2,328	0.76	3.29	2,957	0.74	3.17	2,087	0.82
(m10)	3.45	4,274	0.63	3.44	1,230	0.63	3.29	2,315	0.71	3.36	2,973	0.66	3.39	2,119	0.66
(m14)	3.10	4,266	0.73	3.35	1,235	0.66	3.06	2,307	0.78	3.18	2,982	0.69	3.36	2,120	0.68
(m22)	2.72	4,257	0.93	2.80	1,226	0.91	2.91	2,320	0.89	2.90	2,972	0.95	2.88	2,114	0.89
(m26)	2.59	4,110	0.97	2.52	1,171	0.96	2.81	2,192	0.89	2.59	2,729	0.94	2.61	1,980	0.91
(m30)	2.67	4,046	1.01	3.12	1,192	0.84	2.78	2,178	0.97	2.79	2,911	0.94	3.07	2,088	0.83

Note: m02=Writing; m10=Critical thinking; m14=Solve problems; m22=Work effectively with others; m26=Lead/supervise others; m30=Ability to learn & use new technology.

7.3 The Utilization of Employability Skills

In order to gain some sense of the extent to which graduates' skills are utilised in the labour force, we have constructed tables of graduates' reported use of employability skills in their work. These are the same skills previously evaluated and allow a comparison to be made between possession, acquisition and utilisation. Table 7.5 indicates that employability skill utilization differs dramatically between liberal and vocational graduates. The only skill that is comparable in their utilization is 'Working effectively with others.' In all other cases, vocational graduates are able to employ their skills to a much greater degree than liberal graduates.

Table 7.5 **Fields of Study and Employability Skills Utilization (two categories)**

Fields of Study	*Liberal*			*Vocational*			*Total*		
Skills Utilization	Mean	N	SD	Mean	N	SD	Mean	N	SD
Writing (m04)	3.06	4,137	1.02	3.37	6,475	0.83	3.25	10,612	0.92
Critical thinking (m012)	3.32	4,132	0.87	3.59	6,500	0.67	3.49	10,632	0.77
Solve problems (m16)	3.39	4,129	0.77	3.58	6,510	0.64	3.5	10,639	0.70
Work effectively with others (m24)	3.66	4,122	0.62	3.67	6,503	0.60	3.66	10,625	0.60
Lead/supervise others (m28)	3.03	4,003	0.99	3.15	6,051	0.94	3.11	10,054	0.96
Ability to learn & use new tech (m32)	3.26	3,958	0.84	3.37	6,310	0.75	3.33	10,267	0.78

Note: The variables of employability skills are recoded in a reversed order, 1=not very good, 2=good, 3=very good, and 4=excellent, so a high score indicates a high level of skills.

Table 7.6 provides a more detailed profile describing the extent to which graduates were able to apply employability skills in their work. These desegregated results strongly confirm the previous distinction found between liberal and vocational groups. Only in the social domain (Work effectively with others) do liberal graduates approach the vocational graduates in having opportunities to apply their skill.

The analyses of skill possession, acquisition and utilisation suggest a number of possibilities: that the workplace affords liberal graduates few opportunities to engage their skills; that universities fail to properly equip these graduates, forcing them to rely on their own ability; or that employers fail to make the best use of the liberal graduates talent (whether imparted by the university or not). To the extent employers determine the working conditions and tasks of their employees, it would appear they are perhaps misreading the signals available to them in the liberal education credential conferred by the university on their graduates. Simply, employers may not be

sufficiently aware and involved in the curriculum of the university. We will examine this possibility by examining outcomes for graduates of both liberal and vocational streams who participated in a co-operative education program. Co-operative education programs are a form of alternation training or 'work experience.' They require extensive communication between the university and the employer or company that is participating as a partner in such an arrangement. Employers typically have a better understanding of the university and the student; and similarly, university faculty become more aware of the priorities and unique cultural requirements of the business or service communities.

Table 7.6 **Fields of Study and Employability Skills Utilization (five categories)**

FOS	*Liberal Arts/ Social Sciences*			*Liberal Sciences*			*Education*			*Applied Arts/ Social Sciences*			*Applied Sciences*		
	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD	Mean	N	SD
(m04)	3.06	3,294	1.02	3.05	843	1.01	3.43	2,105	0.83	3.35	2,554	0.84	3.34	1,816	0.79
(m12)	3.3	3,282	0.88	3.4	850	0.84	3.53	2,095	0.74	3.57	2,563	0.67	3.7	1,842	0.58
(m16)	3.37	3,278	0.77	3.46	850	0.76	3.57	2,087	0.66	3.5	2,580	0.66	3.68	1,843	0.56
(m24)	3.66	3,282	0.61	3.63	840	0.64	3.72	2,099	0.55	3.61	2,564	0.64	3.68	1,840	0.58
(m28)	3.04	3,193	0.99	3.02	809	0.98	3.41	1,979	0.84	2.99	2,345	1.00	3.08	1,727	0.89
(m32)	3.25	3,134	0.84	3.32	823	0.82	3.28	1,971	0.78	3.38	2,522	0.75	3.46	1,817	0.68

Note m04=Writing; m12=Critical thinking; m16=Solve problems; m24=Work effectively with others; m28=Lead/supervise others; m32=Ability to learn & use new technology.

8. University-Employer Relationships: The Role of Co-op Education

Our analysis suggests that vocational and liberal graduates do neither differ widely in their perceived possession of employability skills nor in their view that these could be attributed to their educational program. However, liberal graduates report fewer opportunities to use them in the workplace.

One possible reason for this anomaly is the greater affiliation between employers and the more vocationally-oriented university faculties, such as engineering. This would be consistent with Rosenbaum's (1999) signal theory (as applied to school-work transition) which underscores the importance of transmitting trustworthy signals about skills possession between graduates and employers. We suggest that relatively poorer labour market outcomes for liberal graduates are in part due to a blockage of trustworthy signals between liberal graduates and employers.

To further examine this possibility, we compare the labour market outcomes of liberal and vocational graduates who had been involved in co-op education programs as part of their education. We assume that co-op education brings both employers and (future) graduates into closer contact and enhances the employer's awareness and appreciation of students' repertoire of skills. The results presented in Table 8 are positive for both liberal and vocational co-op education participants. However the labour market outcomes are particularly striking for liberal co-op graduates. As compared to non-participants, this group was rewarded with greater employment benefits and had higher levels of job satisfaction. It should be noted that the proportion of liberal education graduates who were involved in co-op programs was not large and considerably lower (3.5%) than the proportion of vocational graduates (10.9%). This suggests caution in interpreting any liberal-vocational comparison. Nevertheless, to the extent co-op education provides employers with better signals regarding students' work habits and employability skills the program should moderate field of study disparities in labour market outcomes.

Table 8.1 **Co-op Education and Labour Market Outcomes by Fields of Study**

Fields of Study	*Liberal*		*Vocational*	
	Co-op Program?			
	Yes	No	Yes	No
Labour force status				
Employed	91.7	87.4	92.9	92.9
Unemployed	8.3	12.6	7.1	7.1
Column Total	169	4,650	621	6,484
Annual job income				
Mean	$29,054	$19,792	$31,938	$27,084
Standard Deviation	$14,282	$13,234	$15,340	$15,815
Column Total	167	4,077	545	5,463
Is the job full time(= or > 30 hours per week) or part time?				
Full time	95.3	75.5	97.0	84.7
Part time	4.7	24.5	3.0	15.3
Column Total	148	3,999	575	5,962
Is the job permanent or temporary?				
Permanent	83.9	68.3	87.5	71.9
Temporary	16.1	31.7	12.5	28.1
Column Total	137	3,740	553	5,626
Job satisfaction				
Very dissatisfied	0.7	3.0	1.6	1.6
Dissatisfied	4.3	12.5	6.1	7.9
Satisfied	42.4	48.9	41.2	44.1
Very satisfied	52.5	35.6	51.1	46.3
Column Total	139	3,733	554	5,637

9. Summary

The analysis of labour market data for the Class of '95 demonstrates the utility of employing a structured individualisation approach to describe the labour market outcomes of university graduates, outcomes that result from individual choice and experience (fields of study) and influenced by demographic, cultural and structural influences. Through the use of regression analysis, we have been able to demonstrate that these influences account for a substantial amount of the explained variance in labour market outcomes. More specifically, we find that gender, age, father's education, provincial residence of graduates prior to enrolment and field of study all significantly contributes to our understanding of variations in labour market outcomes. Rather than thinking of structural factors and individual choice as forces that exert independent effects on labour market outcomes (e.g. wages, job satisfaction) it is best that we understand that these factors work in tandem or in a combined fashion to affect the career pathways of university students, once they graduate and leave the academy. Both types of factors are important in their own right and operate mutually to influence short-run labour market outcomes.

Pivotal to this analysis of labour market outcomes among university graduates has been our assumption that field of study choice – viewed as an indicator of personal agency among university students – would help us better understand differences in labour market outcomes. Furthermore, detailed fields of study were classified as both a dichotomy (liberal and vocational) and also into five major categories (liberal arts/social sciences; liberal sciences; education; applied arts/social sciences and applied science). Given the debate in the literature concerning the relative merits of a liberal or vocational education, we made the assumption that liberal and vocational fields impart different cognitive skills and that these skills relate to the positive and negative labour market experiences of university graduates. We found clear evidence that the labour market favours vocational over liberal graduates with regard to labour force status, employment income and status, job permanence and job satisfaction. In all instances, vocational graduates enjoy significantly greater labour market returns than liberal education graduates.

We then turned to testing our assumption regarding the skills that are acquired by liberal education and vocational graduates. In examining the area of skills, we choose to work with six items: the ability of writing clearly and precisely; the ability to analyse and think critically; the

ability to work effectively with others; the ability to lead or supervise others and the ability to learn and use new technology on the job. All items were conceptualised as appropriate measures of employability skills. When graduates were asked whether they had developed any of the six employability related skills described above, clearly discernible differences in the possession of such skills could be identified in only two out six instances, that is, with respect writing clearly and concisely and the ability to learn and use new technology. It appeared that liberal education graduates were more likely than vocational graduates to maintain that they had developed good writing skills. In contrast, vocational graduates were more likely to argue that they possessed the ability to learn and use new technology. These differences are quite plausible given the curricular differences that characterize liberal and vocational education fields of study. Generally, liberal arts graduates are afforded more of an opportunity to write in their courses and, all else being equal, more effective writers will be selected into liberal fields of study. Conversely, vocational fields are also more likely to recruit university students with an ability to learn and use new technology and to provide them with opportunities to sharpen such acquired abilities. What needs to be underscored though, is the surprising lack of difference between liberal and vocational graduates in their overall possession of employability skills. Given the strong and consistent differences in labour market outcomes between liberal and vocational graduates, we anticipated similar differences in employability skills across these groups. This, then, raises an important question that requires further research: If university graduates in different fields of study believe that they have developed similar skills or abilities in school or at work, then to what do employers respond when they offer graduates in vocational fields of study substantially better labour market returns than graduates in liberal fields? In examining the relationship of field of study, employability skills and labour market outcomes it is clear that we need to attend not only to the preparation of university students but also to the relationship of employers to graduates and to the universities in which they train. This suggests that study of the school-to-work transition process require attention to students, universities (including faculty), and employers. Rosenbaum (1999) refers, for example, to a signalling model of school-to-work transition. In this paradigm, a school-to-work transition system must provide not only training but should also convey trustworthy *signals* about the capacities and competencies of students. Often the quality of information about the employability value of students is problematic. A key reason that accounts

for student's work entry difficulties is poor and untrustworthy information, rather than the amount of available information (Rosenbaum, 1999:236-237).

If we were to think of the relationship of employers and university graduates, these results suggest that employers are more likely to trust the signals provided by vocational graduates over those offered by liberal graduates. This likely reflects the more formalised network with respect to vocational fields of study that link employers, students and the larger university. Thus, it has become part of institutionalized practice for employers to recruit graduates of vocational programs on university campuses. Often university faculty that teach within such programs sustain strong contacts with potential employers as well. These practices are not typically found in liberal fields of study, with the exception of a limited number of co-op programs. With co-op programs there is also the development of teacher-employer linkages and employer-university relationships. Such bonds provide an effective means of conveying information about the work habits of students – information that is generally difficult to communicate through objective methods. As long as teachers are trusted to convey accurate assessments, such interactions are effective ways of fostering trust in ratings (Rosenbaum, 1999:258).

It should be noted that the analysis is based on self-report data by university graduates. Hence, reported differences in skills and their utilization depend on the perceptions of graduates alone. Having similar information from employers – including analyses of recruitment patterns and the rationale for hiring – would provide a more balanced account of the school-to-work transition process. Furthermore, this report explores initial transitions (two years after gradation) of the university graduates, monitoring long term effects of liberal and vocational education is needed since discernable career benefits of a liberal education have been indicated in recent Census studies (e.g. Axelrod, Anisef & Lin, 1999).

10. Policy Research Implications

The empirical findings of this study suggest several policy considerations for improving the school-work transitions of university graduates. First, it is important to acknowledge that selection of a field of study by students contains an element of risk. The selection process has significant implications for labour market success but the pathways beyond graduation are not obvious. The labour market is continually changing, with great variation in occupational employment growth and capacity. One of the keys to dealing with such uncertainty is to provide students with comprehensive career-related information before they make their fields of study choices. Human Resources Development Canada's *Job Futures* initiative represents one such attempt at informing students about the nature of specific jobs, their career prospects, and the necessary educational antecedents. Effective high school career advising also is essential. Increasingly, school counsellors are working with parents to inform and facilitate family efforts to marshal the resources needed for post-secondary education (Sweet, Anisef & Lin, 2000). Relevant and intelligible information about the intellectual requirements and employment potential of university fields of study is essential for individuals and their families who have to choose among educational institutions and programs (Hossler, Schmit & Vesper, 1999).

A second area of concern involves the relatively unfavourable labour market outcomes of liberal graduates who possess employability skills similar to those of vocational graduates. Despite reporting possession of similar levels of skill, liberal education graduates are afforded significantly less opportunity to utilize these skills in the workplace. Moreover, liberal graduates are disadvantaged in terms of their initial salaries and wages: as a group they earn less than their vocational counterparts. This is almost certainly related to differences in the value employers accord the skills of vocational and liberal graduates. Despite the fact that liberal graduates improve their economic position in the labour force at a faster rate than do vocational graduates (e.g. Axelrod, Anisef & Lin, forthcoming), they are initially disadvantaged by the recruitment practices of employers. The rhetoric surrounding employability skills is seemingly inconsistent with the specific vocational skills employers actively seek in their employees (Berryman, 1993; Darrah, 1994; Rosenbaum & Binder, 1997). To some extent this situation is a result of labour market demands. The shortage of graduates with specific vocational skills and knowledge –

especially in fields such as electrical engineering and other computer-related areas – has created demand pressures with commensurate wage premiums as well as favourable conditions of work.

Some provincial governments (notably Ontario) are responding directly to the need for technical skills by funding university programs that are most in demand by industry. While many universities are complying with this imperative, others are moving to create more effective bridges between liberal graduates and their potential employers. Co-op programs, as demonstrated in the report, are one effective strategy for passing trustworthy signals between graduates and employers. It would appear, in fact, that many universities have embraced the co-op concept, applying it with particular vigour to their liberal education programs. The University of B.C. is one example: by 2003 it plans to provide all its undergraduates – including those from liberal fields of study – with co-op placements. The success of co-operative education programs such as this depends on coordinating provincial government (funding) policies with institutional initiatives.

Related to the need for field experience described above is a third policy consideration – universities should provide students in liberal fields with more situated learning opportunities. The reform of curriculum and instructional design improvements are familiar pursuits at most universities. These are usually undertaken through offices of instructional improvement and are aimed at the classroom activities and practices of professors in an attempt to move away from the traditional lecture format. Underlying recent instructional reforms are perspectives on 'student-centered' learning (Prawat, 1992; Norman & Schmidt, 1992; Kaufman, Sutow & Dunn, 1997). These emphasize the need for learning in context, acknowledge the importance of the learner's prior experience, and attempt to engage students in active, participatory learning. They also emphasize the necessity for social exchange in learning, often using co-operative learning circles to create the necessary interaction. The instructional designs that reflect these principles are much better able than traditional lecture methods to ground theory in the realities of students' lives (including their current and future work) as well as fostering the employability skills discussed earlier.

Fourth, it is essential to raise awareness among employers that liberal graduates do not differ markedly from their vocational graduate counterparts in terms of the employability skills they

possess. They do, however, need to be provided with opportunities to prove their mettle on-the-job. This effort to raise awareness would involve, at a minimum, greater dissemination of the results of this and other similar research studies to employer groups across the country.

In concluding our report on the relationship between labour market outcomes and university fields of study we would emphasize that the analysis presents only a partial (economic) picture of the issues involved. A broader understanding of the policy implications involved requires consideration, first, of the motivations of students who act autonomously in selecting their fields of study and in defining their career goals. Students choose educational pathways for a variety of reasons and the decision process doubtless involves a rational accounting of the returns to investment in post-secondary education; but it also represents an expression of personal interest, preference, and highly individual definitions of 'meaningful' work. The force of personal preference and agency in the choice process is explored by Raudenbush and Kassim (1999) in relation to women's participation in post-secondary education. Further research of this sort is needed to determine the complex nature of individual choice in the progression from school to work.

A second consideration requires that the function of liberal education in the university curriculum be considered in relation to the diverse roles that institutions must play in an era of mass education. To the extent that universities have undertaken the task of educating significant numbers of the population (both young and old), they must serve both the intellectual and instrumental needs of their graduates. As previously suggested, research on the 'vocationalizing' of the university curriculum must attend to curricular and instructional design issues; but if policy discussions and decisions are to be adequately informed, research also needs to be extended and broadened to include analyses of the economic, cultural, and social implications of change.

The debate over the purpose and value of a university education frequently is presented as a dichotomy in which the personal, cultural, and social values of a liberal education are pitted against the instrumental 'market' values of a vocational education. This contrast is sometimes necessary to defend both the monetary and non-monetary returns to a liberal education. As typically implemented, however, the university curriculum does not involve an absolute division

between liberal and vocational programs. The liberal arts comprise the intellectual foundation of the university and students enrolled in (baccalaureate level) education, engineering, nursing, and other vocational fields are at least exposed to this influence through elective course work. And for many professional programs an arts and sciences degree is a prerequisite. The effectiveness with which universities pursue their mandate to cultivate an informed and critical intelligence in all their graduates and the degree to which this purpose is under threat by provincial politicians with a wholly market orientation and agenda is nevertheless of great concern. We conclude with a quote from Axelrod et al (forthcoming):

> Overall, liberal arts graduates have succeeded in the world of employment, though the future for students in these and others fields, as always, cannot be predicted with certainty. We contend that liberal education is the core of higher learning - in good economic times and bad - and in its effort to prepare people for employment, the university must not be permitted to raze its own intellectual and cultural foundations. Liberal education has a vital place in arts and science courses, and in innovatively designed professional and vocational programs. In any event, the liberal arts are not static; they continue to be reformed, but less in response to ephemeral market trends than on the basis of evolving intellectual currents. As employers themselves have periodically asserted, by broadening the knowledge base of employees, liberal education can enhance the abilities of graduates in applied fields and enrich society as a whole. As they develop programs and allocate resources, policy makers would be well advised to heed this advice. So, too, would students as they plan their academic and occupational careers (pp. 24-25).

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